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Final Report

1.2-9

Mycosphaerella Blight of Peas in North Eastern Saskatchewan

Funded by
Canada/Saskatchewan ERDA Agreement
and
Saskatchewan Pulse Crop Development Board
1988-1989

Prepared by: B. Berkenkamp
Melfort Research Station

The views expressed in this report are those of the author(s). The Agriculture Development Fund (ADF) does not accept responsibility or liability for any conclusions or recommendations in the report, and cannot guarantee the accuracy of its data or observations.

93-02406/

PEA DISEASE SURVEY

Pea diseases were surveyed in August 1988, in crop districts 5B, 8A and 8B, and severity and prevalence calculated. Pea blight was not as severe (12.9) as in 1987 (19.6), but all fields surveyed were affected, with only 81% of the fields affected in 1987. Most other diseases were at low levels except Powdery Mildew which had a disease index of 33 and 100% of fields affected, compared to 3.2 and 25%, in 1987. Details of the 1988 pea disease survey are shown in Appendix A, which is an unedited copy of the submission to Canadian Plant Disease Survey.

FUNGICIDE - INOCULATION TRIALS

The dry spring in 1988 resulted in low and uneven emergence in the first fungicide test seeded on May 4, and this test was repeated with deeper planting on June 1. The establishment in the second test was improved over the first, but was thin and somewhat uneven. Both tests were inoculated and sprayed with fungicides, resulting in a very low level but significant disease gradient. However the yields were not significant, and therefore could not be correlated with disease level, nor an intensity-loss relationship established. The disease levels and yields of both tests are shown in Appendix B, which is a submission to the Pesticide Research Report.

SEED TREATMENT TRIALS

Fungicidal seed treatments were tested on pea seed heavily infected with Mycosphaerella to determine their ability to control pea blight and other seedling diseases. Four tests were planted, but only three emerged sufficiently to allow counts and disease evaluations. Seed transmission of Mycosphaerella was not found and the only disease found in these tests were low levels of root rot. No significant differences were found in emergence or root rot, and the results are shown in Appendix C, which is a submission to the Pesticide Research Report.

DEVIATIONS FROM WORK PLAN

- Delayed Pea Disease Survey from July to August due to late development of diseases.
- Did not evaluate varieties and lines for resistance due to low disease levels in plots.
- Duplicated fungicide test due to poor emergence.
- Added seed treatment trials.

ACHIEVEMENTS

- Completed and reported, Pea Disease Survey in N.E. Saskatchevan.
- Developed methods for, and established a disease gradient of mycosphaerella in the field.
- Designed and constructed a seed planting template, and used it in seed treatment trials.

STATEMENT OF EXPENDITURES, $

	Requested	Expended Dec. 1988	Projected Apr. 1989
Salaries	8,000.00	7,986.91*	-
Materials			
- Field	700.00	83.02	300.00
- Laboratory	800.00	33.08	600.00
Travel	500.00	-	500.00
TOTAL	10,000.00	8,103.01	1,400.00

*Includes wages and travel for employee and Melfort Agricultural Society fee.

Attached as Appendix D is a statement from J. Solsten, Melfort Agricultural Society.

LIST OF PERSONNEL

	% OF TIME
B. Berkenkamp, Plant Pathologist, Melfort Research Station	40
Colleen Kirkham, Technician, Melfort Research Station	50
Lorene Hurd (6 mo. employee), Sask. Pulse Crop Development Board	100
A.T. Wright - Consultant, Agronomist, Melfort Research Station	1
L. Townley-Smith - Consultant, Agronomist, Melfort Research Station	1
Joy Solsten, Manager, Melfort Agricultural Society	5

Crop / Culture: Pea

Location / Emplacement: Saskatchewan

Name and Agency / Nom et Organisation:

B. Berkenkamp and C. Kirkham
Agriculture Canada Research Station
Melfort, Saskatchewan S0E 1A0

Title / Titre: PEA DISEASE SURVEY IN N.E. SASKATCHEWAN, 1988

METHODS: Twenty fields of pea were surveyed from August 10 to 29, 1988, in crop districts 5b, 8a and 8b. Fields surveyed were selected at random in each crop district, and sampled by collecting ten plants from each field at ten pace intervals. Diseases were identified by symptoms, and the severity of each disease recorded as an estimate of the percentage of leaf or stem area affected. Root rot and foot rot severity was assessed on a scale where 0 = healthy, 2 = trace, 5 = moderate, and 10 = severe. Results for each disease were totaled and averaged over the total number of samples and fields surveyed to give the disease index. Number of fields affected over total number of fields surveyed gave % fields affected.

RESULTS AND COMMENTS: The drought in 1988 probably reduced some diseases, but not powdery mildew, as it was the most prevalent disease (Table 1). mycosphaerella blight was more prevalent and severe than in 1987, but ascochyta leaf spot (A. pisi) and septoria leaf blotch (Septoria pisi) were not found this year. Anthracnose was found at very low levels in 1988.

Table 1. Severity and prevalence of pea diseases

Disease	Disease index	% Fields affected
Mycosphaerella Blight (M. pinodes)	12.9	100
Foot Rot (Ascochyta spp.)	1.8	80
Root Rot (Fusarium spp.)	1.9	90
Powdery Mildew (Erysiphe polygoni)	33.0	100
Downy Mildew (Peronospora viciae)	0.7	5
Anthracnose (Colletotrichum pisi)	0.1	5

APPENDIX 'B'

CROP: Pea (cv. Trapper)

PEST: Seed rot, Damping-off, mycosphaerella blight, and root rot

TITLE: EFFECT OF SEED TREATMENTS ON PEA EMERGENCE AND DISEASES.

MATERIALS: BAY HWG 1608, CGA 142705, UBI 2521-1 (Vitavax + TBZ) and UBI 2531 (TBZ).

METHODS: Pea seed, cv. Trapper with 17.5% Ascochyta and 96% germination was used in four seed treatment trials with 4 replicates and 6 treatments. The treatments and concentrations were HWG 1068 at .02 g ai/kg, HWG 1608 at 0.3 g ai/kg, UBI 2521-1 6 ml product/kg, HWG 1608 at 0.3 ai/kg, UBI 2521-1 6 ml product/kg, UBI 2531 1.75 ml product/kg, CGA 152705 0.4 g ai/kg and a distilled water control. All chemicals were brought up to 10 ml volume in a 10 ml syringe with water and added to 1 kg seed in a plastic pail, which was agitated until all seed was covered with the treatment chemicals. The seed was then air dried. Seed was planted using a plywood template with 6 slots 12.5 cm apart, and 98 cm long. Soil was removed and leveled under the template and 50 seeds placed in each slot, and pressed into the soil with a roller. The depression was refilled with soil and leveled resulting in a uniform planting depth of 4 cm. Trial 1 was seeded on May 19, 2 km west of Melfort Research Station and emergence and root rot evaluated on July 21. Trial 2 was seeded on May 11, on the Research Station and evaluated on June 20. Trial 3 was seeded on May 24 on the Research Station and evaluated on July 8. A fourth trial was seeded on May 27 but due to poor emergence, was not evaluated. The emergence was counted and a percentage calculated. Plants emerged were unearthed and root rot was estimated using a scale where 0 = healthy, 2 = trace, 5 = moderate and 10 = severe. Root rot readings were totalled and adjusted to emergence and presented as disease index (DI).

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RESULTS: See table. No significant differences were found between treatments for either emergence or root rot severity in these trials.

CONCLUSIONS: Severe drought in 1988 suppressed seedling diseases and emergence.

Effect of seed treatment fungicides on percentage emergence and root rot disease index

	% Emergence/DI		
Code	Trial 1	Trial 2	Trial 3
HWG 1608, 2 g	88.5/3.09	75.0/0.47	60.5/1.80
HWG 1608, 3 g	71.5/3.07	68.0/0.85	57.5/1.59
UBI 2521-1	74.0/2.36	80.5/0.87	62.5/1.19
UBI 2531	76.5/1.70	56.0/1.14	52.5/1.26
CGA 142705	66.0/2.62	83.5/0.66	42.0/1.79
Control	84.5/2.51	82.5/0.64	69.5/1.74

APPENDIX 'C'

CROP: Pea cv. Century

PEST: Mycosphaerella blight (Ascochyta pinodes)

TITLE: CONTROL AND INTENSITY-LOSS RELATIONSHIPS OF MYCOSPHAERELLA BLIGHT OF PEA.

MATERIALS: BAY HWG 1608, BENLATE (Benomyl), DITHANE M-45 (80% Mancozeb).

METHODS: Two 4 rep foliar fungicide tests were seeded at Melfort, Saskatchewan in 1988. Test 1 was seeded with a Swift Current seeder in 4 row plots, 5 m long with 21 cm spacing and 92.5 cm between plots, on May 4. Plots were inoculated on June 24, July 13 and Aug. 2, sprayed with fungicides on June 27, dessicated with Reglone on Sept. 13 and harvested on Sept. 22. Test 2 was seeded with a Fabro seeder in 5 row plots, 5 m long with 17.8 cm spacing and 35.6 cm between plots on June 1. The second test plots were inoculated on July 13 and Aug. 2, sprayed with fungicides on July 11, and harvested on Sept. 14. The inoculum for each test was prepared by grinding seven 9 cm petri plates of potato deptrose agar, completely covered with mycosphaerella, in 500 ml water for two minutes in a blender, filtering through cheesecloth and diluted to 5 L in a hand sprayer to cover the inoculated plots in each test. The fungicides were applied with a backpack sprayer at the following rates: Dithane 2.25 kg/ha in 200 L, Bay HWG 1608 1 L/ha in 100 L and Benlate 1.5 kg/ha in 100 L.

Disease ratings were made with a 0-5 scale, based on the area of the plants affected with blight, where 0 = no disease and 5 = 100% coverage, on both tests on Aug. 26. The yield data was calculated from the threshed, cleaned seed from each plot and reported as kg/ha.

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RESULTS: See table. Drought in 1988 had serious effects on these tests, requiring the reseeding of the first test due to poor emergence and reducing emergence in Test 2, as well as reduced levels of disease in the plots. Rains in late mid-season stimulated regrowth in Test 1, which required dessication before harvest. No significant differences were found in yields, in either test. The disease ratings were significant, but the inoculated plots were only different from BAY HWG 1608 and Benlate in Test 1, and Benlate in Test 2, and Benlate was only different from the control in Test 1.

CONCLUSIONS: This test should be repeated in a non-drought year to establish the feasibility of spraying for control of mycosphaerella blight, and to establish the disease intensity-yield loss ratio.

Effect of Inoculation and Fungicides on Disease Intensity and Yield.

	Test 1		Test 2	
Treatment	Disease Rating	Yield kg/ha	Disease Rating	Yield kg/ha
Inoculated	3.00 a	1108	3.00 a	2264
Control	2.75 ab	1114	2.25 ab	2054
Dithane M-45	1.75 abc	1154	2.25 ab	2497
Bay HWG 1608	1.50 bc	1038	1.75 ab	2324
Benlate	1.25 c	1187	1.50 b	2294

APPENDIX 'D'

MELFORT AGRICULTURAL SOCIETY
BOX 816, MELFORT, SASKATCHEWAN. S0E 1A0

TELEPHONE 752-2240

November 29, 1988

Melfort Research Station,
Melfort, Sask. S0E 1A0

Bill Berkenkamp,

Please find listed the expenditures for the Research Project " Agriculture Canada Plant Disease" for the period covering, January 18, 1988 to November 11, 1988.

Wages: Lorene Hurd - $7.25 per hour.	$ 7,567.91
Travel:	89.00
Materials:	116.10
Administration:	330.00
Total:	$8,103.01

Sincerely,
Melfort Agricultural Society

Jcy Solsten

Jcy Solsten
Manager